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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/059,978	01/29/2002	Daniel Bubb	NC 82,974	6076

7590

08/16/2004

Code 1008.2, Naval Research Laboratory
4555 Overlook Ave., S.W.
Washington, DC 20375-5320

EXAMINER

PADGETT, MARIANNE L

ART UNIT

PAPER NUMBER

1762

DATE MAILED: 08/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/059,978

Applicant(s)

Bubb et al

Examiner

M. L. Padgett

Group Art Unit

1762

— The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address —

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

☒ Responsive to communication(s) filed on 3/30/04

☒ This action is **FINAL**.

- ☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

☒ Claim(s) 1-2, 5-12 + 14-26 is/are pending in the application.

Of the above claim(s) _____ is/are withdrawn from consideration.

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) 1-2, 5-12 + 14-26 is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claim(s) _____ are subject to restriction or election requirement

Application Papers

- ☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.
- ☐ The drawing(s) filed on _____ is/are objected to by the Examiner
- ☐ The specification is objected to by the Examiner.
- ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119 (a)-(d)

- ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119 (a)-(d).

☐ All ☐ Some* ☐ None of the:

☐ Certified copies of the priority documents have been received.

☐ Certified copies of the priority documents have been received in Application No. _____.

☐ Copies of the certified copies of the priority documents have been received

in this national stage application from the International Bureau (PCT Rule 17.2(a))

*Certified copies not received: _____

Attachment(s)

- ☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____ ☐ Interview Summary, PTO-413
- ☒ Notice of Reference(s) Cited, PTO-892 ☐ Notice of Informal Patent Application, PTO-152
- ☐ Notice of Draftsperson's Patent Drawing Review, PTO-948 ☐ Other _____

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1. Applicants' amendment and explanation concerning "resonant excitation" provides clarification and removes 112 problems, except for claims 5, 15, 23 and 25.

2. Claims 5, 15, 23, and 25 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

As rejected on page 2, section 1 of paper #5, mailed 12/1/03, the claim of a unit of measurement, with no values attached or associated with it, provides no clear scope, i.e. is vague and indefinite. None of these claims required any particular range of values to be associated with the claimed units, i.e. microns or microseconds or milliseconds or nanoseconds. While one might guess that applicants intend some particular range of values that might commonly be written in the claimed units, a guess does not provide a clear scope. Does "microns" encompass 1-2 μm or 1-10 μm or 0.1-100 μm or 10^{-3} to $10^3\mu\text{m}$ or what? Like questions may be asked about the scope of units ms, μs , and ns. Claimed meaning should not be based on guessing, and the examiner suggests defining with values shown to be supported (and desired) by the specification. A unit is NOT a value.

3. Claims 22 and 25 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Applicants have amended these claims to change the units in the claimed range, but provided no support for the amendments. In claim 22 the range of 100 fs to 5 ps was changed to

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100 fs to 5ms, and 1 MHz to 3 GHz became 1 Hz to 3 MHz, but no such ranges were found anywhere in the body of the original specification. Claim 25 was changed from the unclear range for the laser pulse of "nanoseconds to macroseconds" to another vague range of "nanosecond to microseconds"(see above). While specific examples, such as on p. 12-13 of a 4 μ s wide macropulse at a repetition rate of 30 Hz, with the macropulses made of about 11,400 micropulses of 1 ps, separated by 350 ps was found, no broad range teachings, such as those claimed were found, hence the amendment appears to include New Matter.

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 1-2, 5-21 and 14-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Donley et al (5,002,798), in view of Blanchet-Fincher (5,192,580), or vise

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versa, as applied insertion 3 of paper #5, mailed 12/1/03, optionally considering Gower et al (6,576,869 B1).

Applicants' amendments have added explicit use of light in the IR region to the claims, but both Donley et al and Blanchet-Fincher employ Nd: YAG lasers which are IR lasers. The claims also tie the IR used in with "resonance with a vibrational mode", which p.6 of applicants' remarks clarifies as meaning that it overlaps with wavelengths absorbed by the target material. The laser light causing ablation in the references is clearly being absorbed, otherwise the light would pass through the target or be reflected, not cause the heating that results in ablation.

Applicant's discussion on p. 7 (paragraph bridging to p. 8) to the paragraph bridging page 9-10 are directed to specific materials (hydrocarbons or DNA), where as only claim 12, (and its dependants) directed to polymers structure material is even remotely limited to the generic category of the specific materials applicants discuss, so even claim 12+ can also include a significantly broader range of materials, such as organosilicons, etc. All other claims include all possible materials, such as metals, or inorganic metal containing compounds, etc.

Applicants also make the point that the technology of Donley et al or Blanchet-Fincher would convert the taught material to vapor containing ions and atoms. The examiner agrees with this, however applicants' claim language does not exclude such, because it is consistent with the claim of producing vaporized material. Applicants' discussion of non-destructively converting solid to vapor" is NOT necessitated by the claim language, which would be a significant limitation in claim 12. It is also noted that elemental material, such as metal or carbon, etc, which may be ablated, clearly is not destroyed by the ablation, hence such arguments are not significant over the claimed range of all possible materials (i.e. all inorganic materials).

It is also noted that while the evidence that ablation of material from targets of Donley et al or Blanchet-Finch supports resonance as clarified by applicant, there is no discussion of what “mode” or energy level, such as the claimed vibrational, is involved, nor does the examiner have any way to determine such, except that absorption must occur to enable the formation of the vapor plume as taught. Alternatively, Gower et al teach use of IR lasers in ablation processes, where Co₂ or Nd lasers with wavelengths as taught in the above combination are employed in the removal of dielectric materials, that include resins (polymers) and inorganic materials, where it is taught that the lasers are tuned to the vibrational absorption band of the material being ablated/removed/drilled. See the abstract; absorption spectra in fig. 3-4; col. 3, lines 3-10⁺, 40-64; col. 4, lines 20-col.5, line 6, etc., esp. col. 10, lines 20-28 per vibrational absorption. These teachings are supportive of above assertions of employing absorption spectra to determine suitable wavelengths to employ when causing laser ablation/vaporization /evaporation processes, whether the techniques’ goal is for similar removal or removal in order to deposit as the same physical properties are involved, hence it would have been further obvious to one of ordinary skill in the art to employ absorption spectra for such determination, where Gower et al specifically shows the effectiveness of tuning to the vibrational mode as claimed.

It is further noted that Gower et al does not have any teachings suggesting intact removal (and transfer) of polymer molecules (or biological material), hence this reference would not impact the significant of such a limitation, if it was in the claims, with support from the specification for any such amendment being shown.

6. Copending case to over lapping inventions, Kim et al (6,645,843 B2) is noted to be of interest, but to a different set of limitations; the US references to Hongo (5,304,406), Chrisey

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et al (6,177,151 B1) and Ringeisen et al (2002/0122898 A1) are of interest for use of lasers, including IR or IR beams in the sublimation or transfer of organic materials, but Hongo only generally mentions IR beams, Chrisey et al and Ringeisen et al perform a transfer operation that only partially concerns vaporization, with only the latter discussing vibrational excitation [0053], but Ringeisen et al is not prior art.

7. Applicant's arguments filed 3/30/04 and discussed above have been fully considered but they are not persuasive.

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to M L. Padgett whose telephone number is (571) 272-1425. The examiner can normally be reached on Monday-Friday from about 8:30 am to 4:30 pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive Beck h can be reached on (571) 272-1415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

M.L. Padgett/af
August 3, 2004
August 10, 2004

A handwritten signature in black ink, appearing to read 'Marianne Padgett', with a stylized, flowing script.

MARIANNE PADGETT
PRIMARY EXAMINER